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Classification Management Systems in Statistics New Zealand

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Introduction

This paper discusses the Classification Management System currently used within Statistics New Zealand by looking at the background to the original development of such a system, and highlighting how the system currently works and related issues. The paper will also discuss the potential redevelopments to take place to upgrade how Statistics New Zealand manages its statistical classifications and delivers them to users.

Background

As part of the Information Technology (IT) redevelopment programme in 1996 to move Statistics New Zealand's IT capability from a mainframe to a client/server environment, a classification management system was developed. This system, called the Classifications and Related Standards system (CARS), is a Sybase/Centura application designed as a centralised repository to store all classifications, concordances, synonyms for coding, and SAS formats used within Statistics New Zealand, and also to act as a repository for classifications used across the New Zealand Official Statistical System (OSS).

Originally scoped as a complete metadata system to address the emerging metadata needs within Statistics New Zealand, the project was de-scoped to be a classification repository with links to statistical standards and the ability to produce coding indexes and customised classification reports. However some functionality, whilst identified as useful was not able to be included in the final application. This included a survey link, user notification system and multi-concordance functionality.

The CARS system was introduced into the Statistics New Zealand IT production environment in November 1996 and has remained the central repository for all classifications related material used within Statistics New Zealand. There have been no major changes to the CARS data model since 1996 and the system has been robust and reliable. Upgrades have been done over time to accommodate technology changes or needs, for example changes in Sybase versions, Y2K and Windows changes.

What is CARS?

CARS is an on-line computer package used when storing and working with classifications which:

- Provides centralised classification storage, maintenance and access facilities for all classification data used in the development and processing of surveys;
- Facilitates the use of standard classifications in all statistical data;
- Facilitates the comparison and analysis of data by storing concordances;
- Provides common ways to update and access classifications data.

CARS sits in a development, test and production server environment. Every staff member of Statistics New Zealand has access to the application either in browse mode or through password entry. Browse mode allows users to see and use all released and current classifications only. Password mode allows users to edit, maintain and update classification and concordance information in the application subject to certain security privileges.

CARS Administration

CARS is administered by the Classifications and Standards team (C&S), which is the classifications business unit of Statistics New Zealand. C&S take responsibility for the maintenance and usage of the CARS system, and take ownership of all New Zealand Standard and other Standard classifications used across the Official Statistical System. The benefits of having a centralised classifications unit supported by a central classification repository ensures that there is consistency across classifications and concordances, and that standardisation can be progressed across statistical inputs and outputs.

C&S staff administer CARS through the CARS Supervisor group, which is a group responsible for creating the framework of the classification within CARS, and administering all aspects of the CARS system including training.

Each classification is defined with a unique abbreviation, title and then attributes such as codes, descriptors, labels and edit values are assigned as appropriate by the CARS Supervisor Group. This ensures a level of consistency and also allows a rudimentary monitoring of the use of standard classifications within Statistics New Zealand.

All classifications are owned by an owner user group. This group can include a single person from an organisational business unit and is responsible for maintaining the classifications, versions and concordances that it owns. Membership of an owner user group enables staff to have write access to edit and update classifications and create new versions or concordances.

Types of Classifications

The CARS system currently stores over 4,500 classifications. These are classified as:

- (a) international standards such as ISIC, ISCO, ISCED, CPC;
- (b) Australian and New Zealand standards such as ANZSIC, ANZSCO, ANZSRC;
- (c) New Zealand standards such as NZSCNPO, NZSCSA, NZSCC;
- (d) standard classifications such as Language, Ethnicity, Iwi;
- (e) independent classifications which are survey specific and for which no standard currently exists.

All classifications used within Statistics New Zealand go through a corporate approval process before being stored in CARS, with the exception of the international classifications which are stored for reference purposes only.

Standard statistical classifications are grouped into three categories:

- (a) Australian and New Zealand Standards – these are harmonised classifications jointly produced by Statistics New Zealand and the Australian Bureau of Statistics. These may be based on an international classification modified to Australian and New Zealand requirements. They are used across the Official Statistical System, require significant external and internal input to concepts and structure, and must be approved for use by the New Zealand Government Statistician and the Australian Statistician.
- (b) New Zealand Standards - These may be based on an international classification modified to New Zealand requirements. They are used across the Official Statistical System, require significant external and internal input to concepts and structure, and must be approved for use by the New Zealand Government Statistician.
- (c) Standard classifications - These may be based on an international classification modified to New Zealand requirements, or reflect a common approach across a number of statistical

surveys. They may be used across the Official Statistical System, may have external input to concepts and structure and must be approved for use by the New Zealand Government Statistician.

Independent classifications are those that are specific to one survey or output, and for which there is no existing or available standard classification. As independent classifications are picked up and used across more than one statistical survey, they may progress to being a standard classification, then a New Zealand Standard, and possibly become an Australian and New Zealand Standard.

CARS Navigator Screen

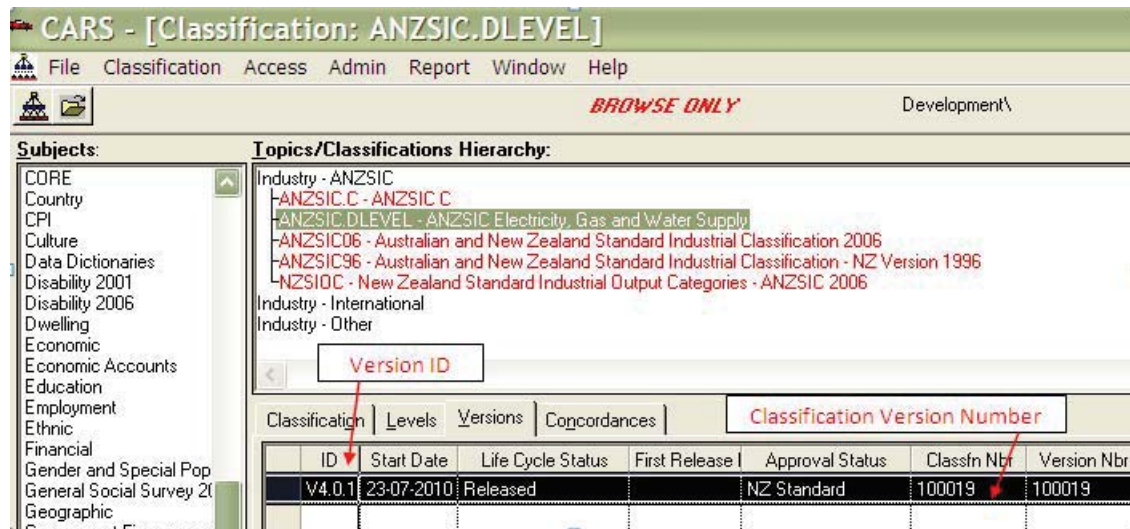
CARS is set up like a hierarchical classification system where users step down through subjects and topics to find a classification and its associated versions and concordances. Subjects are made up of statistical activities, broad subject matters or user defined subjects and within each of these are more detailed topics.

Each classification is given a unique abbreviation of up to 15 characters, a title (subject to naming conventions), a version identifier, a life cycle status (which indicates whether in development, released or obsolete), an approval status (which indicates whether standard or not), a release date and a system generated classification and version numbers (see Table 1).

Current released standard classification text is in the colour red – this was done to facilitate quick identification for users of the relevant classifications to be used. There is no mandatory enforcement for the use of standard classifications within Statistics New Zealand however subject matter areas are strongly advised to use them. Where they cannot, a business case for an exemption or use of another classification must be presented to the Standards Governance Board, which is the corporate approval body for classifications and standards.

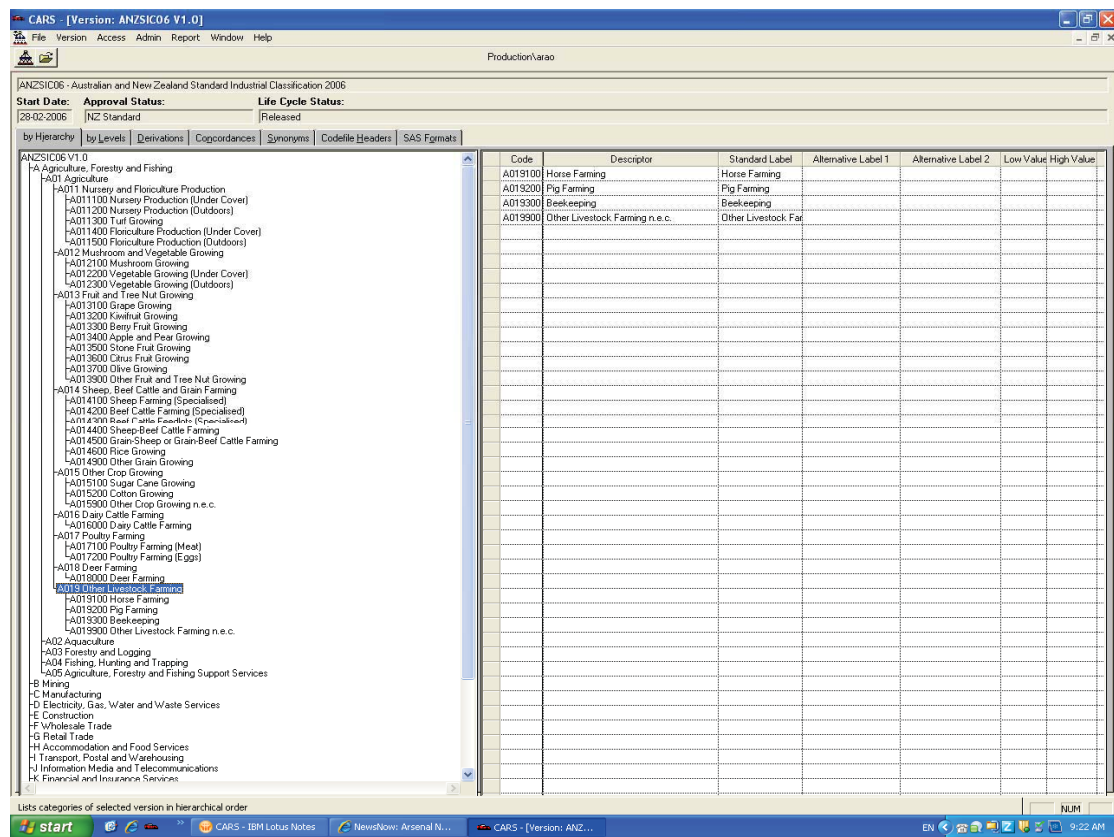
There are a number of protocols and conventions used within CARS. Classification titles adhere to rules specified in the Classifications Best Practice Guidelines document, which is the overarching document on how to produce statistical classifications. Survey specific classifications are given a three character prefix denoting the survey as part of their abbreviation. Classifications can be read restricted so that only selected staff can access or view them. This approach is sometimes utilised with administrative classifications that are used to supply data to Statistics New Zealand from external agencies.

Table 1: Existing CARS Navigator Screen



By double clicking anywhere on the highlighted line showing the relevant ID, Start Date etc, the user is then taken into a second screen (see Table 2 below) which enables viewing of the classification structure.

Table 2: Existing CARS Classification Hierarchy Screen



Concordances

Multi-concordances eg ISIC to SITC to BEC to CPC are not able to be stored in the current CARS system. This means that only one to one classifications or versions can be stored eg ISIC Rev 3 to ISIC Rev 4, or CPC V1.0 to CPC V2.0. The lack of multi-concordance functionality in CARS resulted in a Microsoft Access application being created that pulls concordances out of CARS and allows creation of multi-concordances.

CARS [Classification] M16

File Classification Access Admin Report Window Help

Production Area

Subjects

- Commodity
- CORE
- Country
- CP
- Culture
- Disability 2001
- Disability 2006
- Disability 2011
- Dwelling
- Economic Accounts
- Economic
- Education
- Employment
- Ethnic
- Financial
- Gender and Special Pop
- General Social Survey 20
- Geographic
- Governance Finance and
- Harmised System
- Household and Families
- Household Economics
- Household Labour Force
- Human Settlement and H
- Income and Consumption
- Injury Statistics
- International Statistical W
- International Trade and B
- Justice and Crime
- Labour Force
- Labour Force
- LINZ
- Mabi
- Maori Language Survey
- Meet Social Survey
- Migration
- Multi-Domain Statistics ar
- National Accounts
- Occupation
- Diverses Trade
- Passwords
- Population and Housing I
- Population and Migration
- Pices
- Regional and Environmen
- Research
- Sectional Statistics
- Sex
- Social
- SoFIE
- Student Loans
- Survey of Working Life
- Sustainable Development
- Testing
- Time Series Manager
- Time Use 1998
- Time Use 2003
- Tourism

Topics/Classifications Hierarchy

Target Classification: ANZSIC06 - Australian and New Zealand Standard Industrial Classification - NZ Version 1996

Source Classification	Source Version	Target Classification	Target Version	Concordance ID	Title	Owner User Group	Life Cycle Status	Rev	Concord Nbr
ANZSIC06	V1.0	ANZSIC06	V4.1	C1.0	ANZSIC06 V4.1 (Subclass) to ANZSIC06 V1.0 (Class)	C&S Economic	Obsolete	R	1890
ANZSIC06	V1.0	ANZSIC06	V4.1	C2.0	ANZSIC06 V4.1 (Div4 class) to ANZSIC06 V1.0 (Class)	C&S Economic	Released	R	2257
ANZSIC06	V1.0	ANZSIC06	V4.1	C3.0	Business Frame Agriculture EVAD Industry Coding	Agriculture EVAD	Released	R	2402
ANZSIC06	V1.0	ANZSIC06	V4.1	C4.0	ANZSIC98V4.1 (Division) to ANZSIC06V1.0 (Division)	Population Census	Verified	R	2596
ANZSIC06	V1.0	ANZSIC06	V4.1	C7.0	Test concordance for codefile testing	CARS Supervisor	Released	R	2591

Related Subjects

- Business Statistics
- Census 1996
- Census 2001
- Commoditi

Find Classification...

List's topics for the selected subject and classifications within a selected topic

start

CARS - BM Lotus Notes

NewsNow Arsenal N...

CARS - Classification...

NBM

CARS also has an integrated coding tool – the Classification Coding System (CCS) which enables standardised coding to be utilised within survey processing. The synonyms are stored in CARS within a classification version and can be updated and coding indexes generated on demand. The CCS is available as a downloadable from the Statistics New Zealand website. Additionally CARS supports

the Classification Code Finder which is a web enabled coding application also available on the Statistics New Zealand website.

http://www.stats.govt.nz/tools_and_services/tools/ClassificationCodeFinder.aspx

The CARS system has a corporate approved policy requiring its use for all classifications information. There are a number of policies and protocols supporting its use and regular staff training programmes are run to enable staff across the organisation to use the application.

International Recognition

The original data model for CARS was supplied to Statistics Slovenia, which then formed the basis of their classification system (Klasje), and was also supplied to Statistics Austria. A customised CARS application was sold to the Central Statistical Office in Ireland, along with the Statistics New Zealand Business Frame and Balance of Payments system. The CARS data model and application was then converted into Microsoft SQL Server version which was sold to Statistics South Africa.

Future Developments for Classification Management in Statistics New Zealand

The existing CARS system was introduced to Statistics New Zealand in 1996 and has had no modifications or enhancements added since that time. Whilst CARS still performs as designed, and meets the primary needs for classification management, many IT systems that use CARS have been modified or business unit requirements have changed resulting in some need for work-arounds. This has most clearly been identified in the increasing production of output views of classifications to reflect user driven survey outputs which are not easily dealt with in the current CARS system. Another issue appearing is the increasing need to build multi-concordances between related classifications as opposed to classifications that are the same, for example, industry to harmonised system to broad economic categories, compared to industry to industry.

Some of the originally scoped aspects of CARS that were not included in the production system are now required, especially as the organisation works to develop a corporate metadata solution. The ability to easily link surveys to the classifications they use, notify users of changes as they happen, and to easily search across the database were unable to be included. A survey of users highlighted that these functions are essential components for any redevelopment.

In order to investigate requirements, a CARS ‘proof of concept’ (PoC) was created to demonstrate the potential benefits and efficiencies of upgrading the system, and demonstrate a platform for a full redevelopment of CARS. Some of the high level benefits were seen as:

- Facilitating use of standard classifications within administrative data sources across the Official Statistical System;
- Providing a centralised, visible and integrated solution for statistical infrastructure and metadata components;
- Enabling better relationships between statistical information and reporting on classification use;
- Increasing effectiveness and efficiency of classification, concordance and codefile management which would release resources to carry out more value-added tasks;
- Making classifications and standards easily accessible on the web and enabling standardisation across the Official Statistical System.

Key Aspects of the CARS ‘proof of concept’

One of the primary concerns introducing a new system into an IT environment managing legacy system issues is to ensure that information created and stored in a new management system can be migrated back to the old system. This would enable existing infrastructure to continue to operate with classifications information until these systems were redeveloped.

Other changes proposed to the system are:

- Platform change from Sybase/Centura to Microsoft SQL Server 2008
- A classification view allowing recoding of classifications
- Improved navigation and search capability
- Multi concordance functionality
- Improved usage and notification management
- More linked internal systems

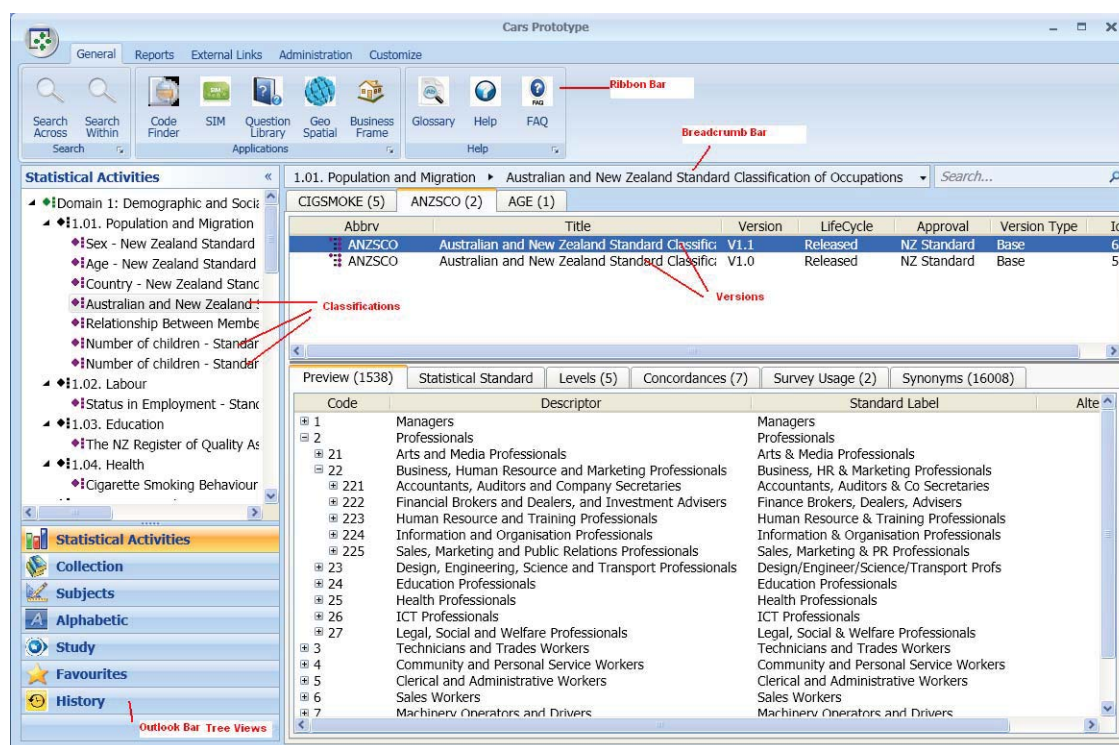
- Better support for storing statistical standards information
- Automatic web publishing of classifications, standards, and categories.

In 2010 a 'proof of concept' (PoC) version or prototype of a potential new CARS was developed and included some of the above features.

NB: The discussion that follows is based on the proof of concept system developed. Concepts, names of attributes and definitions presented are those used for the proof of concept exercise and should not be regarded as the final product. There are a significant number of metadata and classifications best practice issues to be addressed in a new CARS system should one be developed. It should also be noted that most of the existing functionality would be carried across so the following discussion focuses on the enhancements or changes proposed.

Navigator Screen

The PoC revamped the navigator screen to be more in keeping with current Microsoft products.



There are a number of ways to view classifications (as can be seen in the bottom left corner of the illustration above). The primary view is by statistical activities which uses the domains and activities prescribed in the United Nations Classification of Statistical Activities, which was adopted as a New Zealand Standard Classification in 2010. This view also allows SDMX compatibility. Other views are by statistical collection, subjects (as per the current CARS), alphabetically, or by user defined favourites or browsing history.

Available classifications are viewable in the left hand column and then displayed in the top of the navigator screen with a preview of the full classification at the bottom. Users are then able to view the supporting statistical standard, concordances, survey usage of the classification and synonyms (used for creating coding indexes).

Searching Across Classifications

Searching across classifications in the CARS PoC is very easy with a standard search engine capability included as shown in the following illustration.

The screenshot shows a window titled "Search Across Classifications" with a search bar containing "New Zealand" and a "Search" button. To the right, there are checkboxes for "Classification", "Concordance", "Category Values", "Synonyms", and "Concordance Values". Below the search bar, there are three tabs: "Category (72)", "Synonym (111)", and "Concord Values". The "Category (72)" tab is selected, showing a table with columns "Classfn II", "Title", and "Abbreviation". The table lists several classifications, including "Australian and New Zealand Standard Industrial Classification", "Sex - New Zealand", "Iwi - New Zealand Standard Classification", "Age - New Zealand Standard Classification", and "Broad Economic Categories - New Zealand Standard Classification". A mouse cursor is hovering over the "Open in new Tab" button next to the "Sex - New Zealand" entry.

Classfn II	Title	Abbreviation
13	Australian and New Zealand Standard Industrial Classification	ANZSIC96
63	Sex - New Zealand	SEX
109	Iwi - New Zealand Standard Classification	IWI
127	Age - New Zealand Standard Classification	AGE
193	Broad Economic Categories - New Zealand Standard Classification	NZBEC

The ability to search for a word or category within a classification is part of the existing CARS system but this facility has been enhanced to also allow searching across concordances and synonyms for coding. Previously users were required to extract concordances and or coding indexes into Microsoft Excel or Microsoft Access to be able to find specific words in these two important components.

The screenshot shows the same "Search Across Classifications" window, but with the search bar containing "plant". The search results are displayed in a list box, showing a long list of classifications, including "Australian and New Zealand Standard Industrial Classification - NZ Version 1996", "Australian and New Zealand Standard Industrial Classification 2006", "Broad Economic Categories - New Zealand Standard Classification 1988", "Central Product Classification", "Cigarette Smoking Behaviour Classification", "Country - New Zealand Standard Classification 1999 - 4 Numeric", "Currency - Standard Classification", "Ethnicity New Zealand Standard Classification 2005", "Family type standard classification 2008 - Master version", "General Electoral District 2007", "International Standard Classification of Occupations 2008", "International Standard Industrial Classification of All Economic Activities", "International Standard Industrial Classification of All Economic Activities Rev. 4", "Iwi - New Zealand Standard Classification", "Māori Electoral District 2007", "Meshblock 2010", "New Zealand Harmonised System Classification", "New Zealand Standard Classification of Occupations 1999", "Number of children - Standard classification 2009", "Number of children - Standard classification 2009 - Census version", "Occupied Dwelling Type Standard Classification 2009", and "Regional Council 2010".

Category II	Code	Description	Classfn Abbrev
46505	A0111	Plant Nurseries	ANZSIC96
46525	A0169	Crop and Plant Growing nec	ANZSIC96
46866	L7743	Plant Hiring or Leasing	ANZSIC96
46959	A01110	Plant Nurseries	ANZSIC96
46985	A01693	Crop and Plant Growing nec	ANZSIC96
47328	L77430	Plant Hiring or Leasing	ANZSIC96

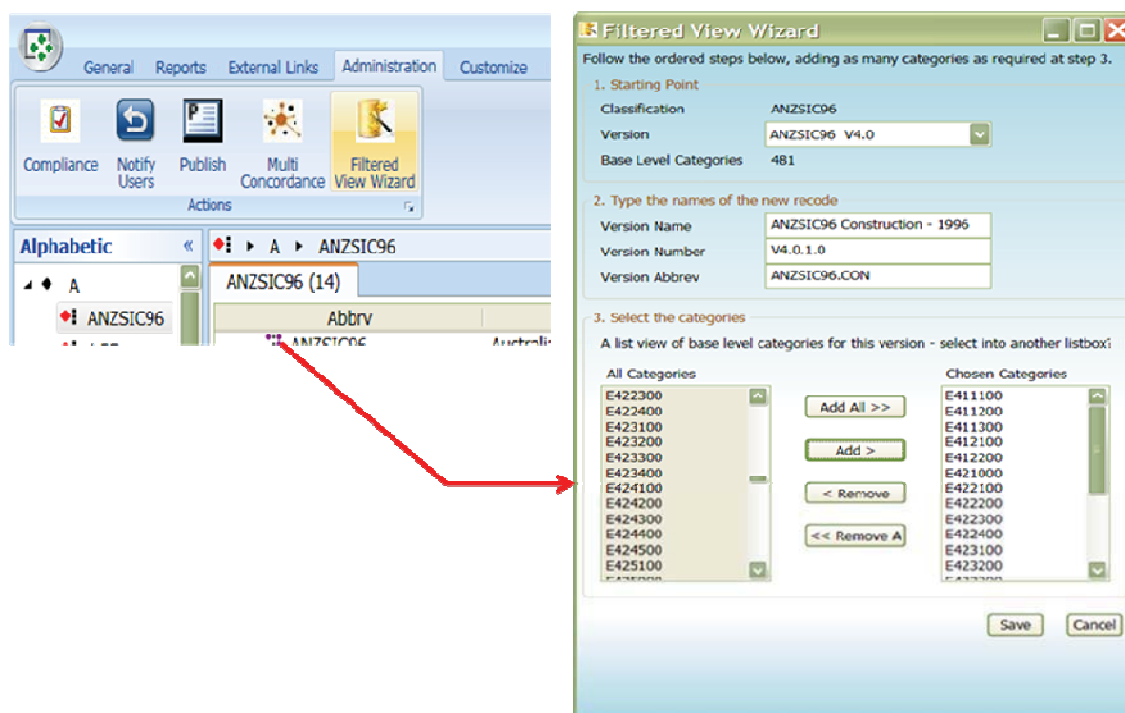
Filtered and Recoded Classifications

To address the increased demand for different types of output classifications, an option which is currently called 'Filtered and Recoded Classifications' has been introduced into the PoC. This gives users the flexibility to create different views of classifications, or create different aggregations of a classification.

- **Filtered Classification** is a portion of the original classification with no changes to the codes or descriptors.
- **Recoded Classification** is a Parent/Child relationship between codes is not related i.e. codes are not sequential.

A filtered view is not necessarily the equivalent of an alternative view.

From the Filtered View Wizard it is just a case of selecting the classification and then selecting the categories required for the recode from the 'All Categories' box and add them to the 'Chosen Categories' box and click save.



The resulting filtered views can then be stored in the CARS PoC and be accessible under the view of the parent classification. The same process can apply to creating recodes.

Multi-Concordances

One of the key functions that users have requested is the ability to create multi-concordances ie concordances between more than two classifications or versions. As stated earlier the current CARS system uses a Microsoft Access application to enable the creation of multi-concordances and this process has been built into the CARS PoC model. There are two types of multi-concordances available. These are:

- Multiple versions of the same classification
- Multiple versions of different classifications

The former enables the creation of a complete time-series for all codes contained in a classification and this is particularly useful where the conceptual base and structure of the classification has not changed. The latter option enhances the capability to link different but related classifications, for example industry to product to trade. This may facilitate the identification of common areas across classifications that may lead to a rationalisation of existing standards.

A design wizard is used to create the concordances and this is illustrated below. Upon completion the multi-concordance can be exported into applications such as Microsoft Excel.

Multi Concordance Design Form

Follow the ordered steps below, adding as many concordances as required at step 3

1. Starting Point

Classification

ANZSIC96

Version

ANZSIC96 V1.0

Initial Concordance

ANZSIC96 V1.0 to ANZSIC96 V2.0

Target Classification

Own

Target Version

2. Type of Multi-Concordance

☒ "CHAIN" - a source => target concordance based on a sequence of intern
eg ANZSIC 96 v1 => v3 is made from ANZSIC96 v1=>v2 + ANZSIC96 v2:

☐ "TREE" - a source => multi-target view based on a sequence of intermedi
eg MB10 => TA10/AU10 is made from MB10=>TA10 + MB10=>AU10

3. Build Concordance List

Next Concordance:

ANZSIC96 V4.1 to ANZSIC96 V4.0

Add

Source Version	Target Version	Concord ID	Direction
ANZSIC96 V1.0	ANZSIC96 V2.0	78	Forward
ANZSIC96 V2.0	ANZSIC96 V3.0	411	Forward
ANZSIC96 V3.0	ANZSIC96 V4.0	758	Forward

4. Resolved Concordance Data

Refresh

Export to Clipboard

ANZSIC96_V1_0_	ANZSIC96_V2_0_	ANZSIC96_V3_0_	ANZSIC96_V4_0_
A	A	A	A
A01	A01	A01	A01
A011	A011	A011	A011
A0111	A0111	A0111	A0111
A011100	A011100	A011100	A011100
A0112	A0112	A0112	A0112
A011200	A011200	A011200	A011200

Multi Concordance Design Form

Follow the ordered steps below, adding as many concordances as required at step 3

1. Starting Point

Classification

MB10

Version

MB10 V1.0

Initial Concordance

Meshblock 2010 to Area Unit 2010

Target Classification

AU10

Target Version

2. Type of Multi-Concordance

☐ "CHAIN" - a source => target concordance based on a sequence of intern
eg ANZSIC 96 v1 => v3 is made from ANZSIC96 v1=>v2 + ANZSIC96 v2:

☒ "TREE" - a source => multi-target view based on a sequence of intermedi
eg MB10 => TA10/AU10 is made from MB10=>TA10 + MB10=>AU10

3. Build Concordance List

Next Concordance:

Meshblock 2010 to Maori Electoral Dist

Add

Source Version	Target Version	Concord ID	Direction
MB10 V1.0	AU10 V1.0	2520	Forward
MB10 V1.0	TA10 V1.0	2541	Forward

4. Resolved Concordance Data

Refresh

Export to Clipboard

MB10_V1_0_	AU10_V1_0_	TA10_V1_0_	
0000100	500206	001	
0000200	500206	001	
0000300	500206	001	
0000400	500206	001	
0000501	500206	001	

Survey Linkage

One of the more important features to be explored in the CARS PoC is survey linkage functionality. The benefit of this function is that it provides information on which surveys are using which classifications and facilitates the monitoring of the use and compliance of standard classifications.

Cars Prototype

General

Reports

External Links

Administration

Customize

Code Finder

SIM

Topic Library

Geo Spatial

Business Frame

Glossary

Help

FAQ

Search Across

Search Within

Applications

Help

CURRENCY

CURRENCY (4)

Abbrev	Title	Version	LifeCycle	Approval	Version Type	Id
CURRENCY	Currency - Standard Classification	V4.0	Released	Standard	Base	6463
CURRENCY	Currency - Standard Classification	V3.0	Released	Standard	Base	3398
CURRENCY	Currency - Standard Classification	V2.0	Obsolete	Standard	Base	3187
CURRENCY	Currency - Standard Classification	V1.0	Obsolete	Standard	Base	2487

Preview (51)

Statistical Standard

Levels (1)

Concordances (0)

Survey Usage (4)

Synonyms (107)

Survey Title	Survey Period Title	Version Abbrev	Cvn Id
Census of Population and Dwellings 2006	Census 2006	CURRENCY V4.0	6463
Annual Frame Update Survey	AFS 2008	CURRENCY V3.0	3398
Annual Frame Update Survey	AFS 2009	CURRENCY V4.0	6463
Commodity Data Collection Survey	CDS 2008	CURRENCY V4.0	6463

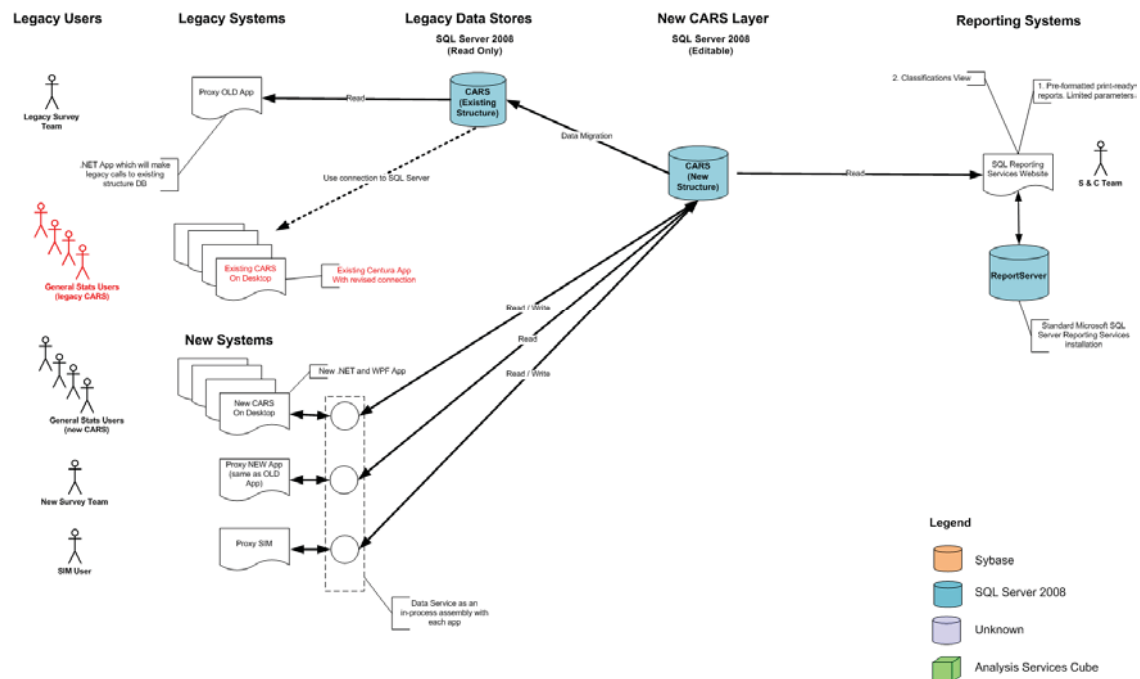
Additional Features

Other features required for future classification management are:

- the ability to notify internal users of classification changes or updates by automatically creating an email with the relevant contact persons populated in the 'To' box, based on the survey linkage information;
- better integrated linkages with internal IT systems, .NET survey systems and external websites
- storage of statistical standards, which contain the supporting metadata for a classification, and web enabled publication of these.
- Web accessibility for viewing and managing classifications

Appendix 1: Data Architecture Model of CARS Proof of Concept

Stats – Proof of Concept CARS Architecture



Appendix 2: Possible Production Architecture for a new Classification Management System

Stats – Possible Production CARS Architecture

